INFORMATION PERVADES ALL LEVELS OF WAR

A STUDY OF INFORMATION OPERATIONS IN IRAQ

by

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Preface

This essay is intended to give readers a better understanding of how information applies to all levels of war--tactical, operational and strategic. Most discussions of information operations address information use only at the tactical and strategic levels of war, neglecting the operational level. With this essay, I attempt to fill that void. Notable is my classification of intelligence gathering as a largely operational level endeavor.

This essay was written within the construct of U.S. information warfare experiences in Iraq, ranging from Operation Desert Storm up to and including Operation Iraqi Freedom. Aside from providing a worthy basis for analysis, this also helped to narrow the scope. A specific goal of this essay was to capture the unique and unprecedented media coverage surrounding Operation Iraqi Freedom, which is still ongoing at the time of this writing.

I would like to thank Major Paul Guevin for providing a tremendous stream of resources on the topic of information operations. I would also like to thank Lt Col Joe Reynolds for his assistance and research materials.

Abstract

According to U.S. Joint Military Doctrine, the central hypothesis of IO is exploiting the enemy's information and information systems, while protecting one's own. (JP 3-13) IO is a concept as old as warfare itself, but has attracted more attention in recent years due to leaps in information technology. Global Positioning System, data links, computer networks, and even the media represent just a few facets of this glittering gem. IO is ubiquitous and applies across all phases and ranges of military operations, and pervades all levels of war…tactical, operational and strategic, making it a nation's single most powerful weapon. Although used extensively throughout the history of warfare, nowhere else has IO served a more extensive role than in than in U.S. military actions in Iraq.

Information Pervades All Levels of War: A Study of Information Operations in Iraq

Modern wars are won by dominating the information realm. "Today the ability to collect, communicate, process, and protect information is the most important factor defining military power. In the past armor, firepower, and mobility defined military power, but now it often matters less how fast you can move or how much destructive force you can apply. Stealth trumps armor, precision trumps explosive force, and being able to react faster than your opponent trumps speed. If this is true, then to defeat your opponent, you must first win the information war." (Berkowitz, 21) Militaries accomplish this through means and resources classified under the broad category of information operations (IO).

According to U.S. Joint Military Doctrine, the central hypothesis of IO involves actions taken to affect an enemy's information and information systems, while protecting one's own. (JP 3-13, I-1) IO is a concept as old as warfare itself, but it has attracted more attention in recent years due to leaps in information technology. GPS, data links, computer networks, and even the media represent just a few facets of this glittering gem. IO applies across the full spectrum of military operations, and pervades all levels of war…tactical, operational and strategic, making it a nation's single most powerful weapon. Although used extensively throughout the history of warfare, nowhere else has IO served a more prominent role than in than in U.S. military actions in Iraq.

From Operation Desert Storm to Operation Iraqi Freedom, U.S. military action in Iraq is replete with examples of IO in warfare, therefore it serves as a useful context for analysis. Desert Storm is significant because it is considered the threshold event for modern IO.

(Berkowitz, 2) It was characterized by high-tech communications, precision guided munitions (PGM), stealth, satellites, signal collection, and sophisticated imagery, creating unprecedented situational awareness of the battle space. After Desert Storm, IO continued in the form of satellite and aircraft imagery, HUMINT, SIGINT, more PGMs, and passionate propaganda battles with Saddam Hussein's regime and its supporters. More recently, the war on terror and hunt for WMD has once again brought coalition forces into the Iraqi desert under the banner of Operation Iraqi Freedom. To the greatest degree yet, this latest clash has been an information war, waged with PGMs, PCs and propaganda.

Understanding the Information Domain

In order to grasp the significance of information as a weapon of war, one must first understand the information domain. Information consists of facts, data and the meanings assigned to them. The *information domain* includes information itself and a large group of info system components. Thomas Rona, former Boeing engineer and info warfare guru, broadly defined information system components as hardware, software, system operators, system users, and data. Given the supposition that wars are fought and won in the information domain, the best way to defeat an enemy is to attack the *components* of its information systems. The best component to attack depends on the opportunities at hand and the risks one is willing to take. (Berkowitz, 30)

After determining which system component to attack, the information warrior must answer the confounding question of whether to deny, deceive, destroy or exploit enemy information. The correct answer is "it depends." One may want to deny or destroy encrypted avenues of communication to force the enemy into using open lines that can be exploited. When ones own information system is being exploited, inserting false data into that system to deceive

the enemy may be the best choice. Another consideration is preserving an enemy's information system for later use, such as when re-establishing the peace.

In Operation Iraqi Freedom, the coalition preserved much of Iraqi State Television's infrastructure, interrupting broadcasts only for short periods of time. It is conceivable that the Coalition could have completely destroyed Iraqi TV if they desired, but the benefits of having a working TV station as an avenue for communication with the masses when re-establishing the peace was considered more valuable. Still, the U.S. had other means to subdue Iraq's information based targets without permanently destroying them. Many of these "non-lethal" methods rely on new technologies, which historically have had a profound impact on military affairs.

"Throughout history, military doctrine, organization and strategy have continually undergone profound changes due in part to technological breakthroughs. The Greek Phalanx, the combination of gun and sail, the levee en masse, the blitzkrieg, the Strategic Air Command—history is filled with examples in which new weapon, propulsion, communication, and transportation technologies…enabled the innovator to avoid exhausting traditional battles and pursue instead a form of decisive warfare." (Arquilla, AC, 24) Today cheap computers can process even complex data with ease. (Berkowitz, 19) Satellite links, fiber optics, and digital, networked communications make it possible to instantaneously deliver information almost anywhere at any time. More than ever before, information is omnipotent and suffuses every instrument of national power. It transcends all mediums. It pervades all ways, means, and levels of war…tactical, operational, and strategic.

Tactical, Operational and Strategic Levels of Information War

Tactical, operational and strategic levels of war apply uniquely in the information realm. Joint Publication 1-02 defines the *tactical* level of war as that which battles and engagements are planned and executed to accomplish military objectives. (JP 1-02) It is focused on the order and maneuver of combat elements against the enemy. Tactical use of information refers to information that influences or enables those battles and engagements; for example, GPS data permits a precision weapon to hit its target.

The *operational* level of war encompasses a broader dimension of time and space than do tactics, including logistical and administrative support for tactical forces and the sequencing and exploitation of tactical successes to achieve strategic goals. (JP 1-02) Operational use of information may include satellite imagery that shows the location and size of enemy forces, allowing friendly forces to gain maneuver advantage.

The *strategic* level of war is the level at which nations or alliances determine security objectives and direct the use of national resources to accomplish them. (JP 1-02) More than the other levels, it involves all national instruments of power. In the context of information, this may include diplomacy and use of the media in all its forms. Pinpointing what is tactical, operational or strategic is difficult, however U.S. experience in Iraq presents many examples that can be loosely categorized into the three levels of war.

Information as a Tactical Weapon.

Information has been used in Iraq at the tactical level of warfare in countless ways. Stealth technology denied the Iraqi air defenses critical information--namely the ability to “see” USAF F-117s and B-2s with radar. GPS gave Coalition ground forces a distinct advantage in navigating a featureless desert. Fused with other intelligence, it provided situational awareness

of friendly and enemy troop locations, allowing coalition forces to optimize resources and direct fires against the Iraqi army. Laser Guided Bomb's (LGB) processed laser dot information to precisely guide bombs to their targets, producing decisive results. Although fewer than 10% of the weapons dropped in Desert Storm were LGBs, they inflicted 75% of the damage. (Glosson) By the mid-1990s, GPS aided bombs such as the Joint Direct Attack Munition (JDAM), enabled the U.S. to hit any target in any weather, with near precision. Some bombs achieved effects without actually destroying their targets, such as the formerly classified BLU-114, which according to newscientist.com, disperses thousands of carbon fibers designed to short out electrical grids. (Walden)

Other new information technologies enhanced command and control and provided superior battlespace awareness, which permitted more efficient target engagement. During Operation Desert Fox (1998 air attacks on Iraq by U.S. and British forces) advanced information technologies enabled the AF and Navy to coordinate activity through an interoperable command and control network. This allowed near simultaneous missile attacks of nearly 50 targets. (McNamara) Several years earlier, Joint Surveillance Target Attack Radar System (Joint STARS) fused Synthetic Aperture Radar (SAR) and Moving Target Indicator (MTI) to provide a detailed picture that was used in numerous air-to-ground and surface-to-surface targeting functions. Joint-STARS, combined with SIGINT and other intelligence, pinpointed enemy threat locations and enabled strike aircraft to hit mobile and even moving targets with ease. Since its debut in Desert Storm's highway of death, it's been indispensible, particularly as an aid to time sensitive targeting (TST).

Unmanned Aerospace Vehicles (UAV) such as Predator can also provide similar TST information. Although its use in Iraqi Freedom was not confirmed, Predator, armed with the

Hellfire missile, can locate a moving target, engage it, kill it, and then transmit the bomb damage imagery back to the Air Operations Center. This perfectly demonstrates General John Jumper's concept of Find, Fix, Track, Target, Engage, and Assess (F2T2EA). Finally, as demonstrated in both Northern Iraq and Afghanistan, ground forces equipped with GPS and laser range finders pinpointed TSTs, and then beamed encrypted coordinate data to an orbiting strike aircraft armed with JDAM to quickly neutralize them. Information superiority has given U.S. armed forces precision strike capability and a distinct time advantage, but Iraq has also successfully used information on a tactical level against the U.S.

In Iraqi Freedom, Saddam's army used information deception on the tactic level with lethal effects. In violation of the laws of armed conflict, Iraqi special militia and the Fedayeen Saddam, wore civilian clothes to hide their military uniforms, faked surrender in order to ambush Coalition forces, and donned authentic looking U.S. uniforms to trap legitimate surrendering Iraqi forces and execute them. This type of tactical deception created cascading effects that had impact at the operational level of war and beyond.

Information as an Operational Weapon

Most discussions of information warfare focus either on the tactical or strategic level of war, but it also plays a role at the operational level. For instance, intelligence gathering, which is normally considered to reside at the strategic level of war, fulfills many operational level functions such as determining force movements and sequencing of operations. This is a big part of Intelligence Preparation of the Battlespace (IPB), which falls squarely at the operational level. IPB was particularly good in Iraq because U.S. forces had a long time to collect intelligence in the months preceding Desert Storm. Since then, the U.S. has persistently collected intelligence information in all its forms in Iraq, especially in reinforcing the no-fly zones and monitoring for

evidence of weapons of mass destruction. It has also gone to great lengths to protect its information through Operational Security (OPSEC).

OPSEC is simply the degree to which the truth is concealed or revealed. A useful analogy is the opening or closing of a window blind. The famous "Left Hook" provides an excellent example of offensive and defensive OPSEC. In Desert Storm, Coalition forces prepared a marine amphibious assault from the Persian Gulf. This preparation was real, and all the U.S. marines fully expected to attack according to plan. The "blinds" were slightly opened to allow the enemy to see this preparation and draw their own conclusions (offensive OPSEC). Not revealed to the Iraqis were the movements of an entire U.S. Army Corps in the western Iraqi desert (defensive OPSEC). General Schwarzkopf revealed one truth and concealed another to shape the Iraqi Army's response. This is a classic example of information used as a weapon at the operational level. Modern technology, however, has introduced new high tech methods of using information systems as weapons, as demonstrated in the weeks preceding Iraqi Freedom.

The Department of Defense sent thousands of e-mail messages beckoning Iraqi military leaders not to use WMD against Coalition forces, and promising protection for those who comply. The 193rd Special Operations Wing and the Central Intelligence Agency were involved in the e-mail campaign along with Iraqi defectors who may have contacted their former colleagues…imploring them to cooperate with U.S. forces. According to senior military sources, this was the first time the U.S. had used e-mail in an information warfare campaign of this kind. One drawback is that in Iraq all Internet traffic is monitored as it passes through government owned ISPs, so it may not have reached too many people. Nevertheless, even if only word of these e-mail messages reached their targets, it was a worthwhile effort. (Caterinicchia) As a

minimum it may have had psychological effects on Iraqi leaders, realizing that the U.S. could reach them so easily.

In a similar manner, the U.S., in contact with an exiled Iraqi middleman, opened lines of communication to senior Iraqi security officials prior to hostilities. This secret campaign was designed to undermine the rickety foundations of Saddam Hussein's rule. Also, President Bush issued a directive to train 5,000 Iraqi exiles to assist U.S. troops during hostilities. This effort was "part of a plan that linked intelligence, diplomacy, psychological warfare and military action." (Elliott, 35)

U.S. forces also used psychological operations (PSYOPS) via TV and radio broadcasts. The 193rd Special Operations Wing of the Pennsylvania ANG, flying their specially equipped EC-130 Commando Solo aircraft, broadcast President George W. Bush's address over Iraqi AM/FM radio, TV and short wave military communications bands. President Bush urged the Iraqi military not to fight for a dying regime. (Elliott) Later, the news media broadcast a rumor that Turik Aziz, the Iraqi Deputy Prime Minister, had defected to Turkey where he was in the custody of U.S. and Turkish authorities. This rumor turned out to be false. However, for a brief period the world pondered the implications for continued Iraqi resistance. This could have devastated Iraqi military resolve if it had not been quickly refuted. The rumor may have been deliberately implanted as part of a psychological operations effort. Sometimes, this technique of disinformation is used to evoke a TV appearance by an enemy leader, which may enhance the ability to track them electronically. However, this can be a risky proposition because it offers the enemy an opportunity to use that TV appearance to achieve strategic effects.

Information as a Strategic Weapon.

Information is used as a strategic weapon primarily through the media. Media shapes world opinion. World opinion can greatly influence military actions. Preceding both Desert Storm and Iraqi Freedom, world opinion influenced United Nations members to take their stand either in support or against military action. In 1991, liberating Kuwait was a relatively easy choice for many nations. In 2003, supporting a preventive war like Iraqi Freedom was difficult; therefore it didn't earn the overwhelming support of the world nor the UN Security Council. Recognizing this potential, the U.S. has a vested interest in shaping world opinion in its favor. This concept is aptly called Strategic Information Operations (SIO), which is the "integration, deployment and control of media and information as a non-lethal means to channel perceptions in a favorable direction to our political aims." (D'Amico, 49)

U.S. perception management efforts have atrophied over the last decade, in spite of how important it is to national security. "For years the FBI has listed foreign influence operations, or perception management, as one of the eight key-issue threats to national security…ranking with terrorism, attacks on U.S. critical infrastructure, weapons proliferation and espionage." (Waller, 18) During the elder Bush and Reagan years, the Pentagon had its own Public Diplomacy Directorate to run info campaigns abroad, and the U.S. Information Agency housed an effective arm called the "Office to Counter Soviet Active Measures." The CIA employed between 200 and 250 officers solely dedicated to influencing perception management abroad. Today this office is one-tenth that size. One of the few arrows the U.S. has in its quiver is Voice of America broadcast in Iran, Iraq and Afghanistan, but any gains in the battle for hearts and minds have been quickly undermined by Al Jazeera and other Arab media spouting anti-American

propaganda. (Waller) Alas, the Arab street is skeptical of American intentions, even in the face of a very persuasive and powerful American media.

"The United States currently has…the most powerfully persuasive media in the whole world. But while paranoids around the world regard these media as witting ideological agents of the U.S. government, Washington not only does not control their output, it does not even have a sophisticated grasps of how the media impact global affairs." (Toffler, xvi) To make matters worse, instantaneous reporting, made possible by modern information technology, presents special challenges to perception management and can have profound effects on military operations. This was never more apparent than with Iraqi Freedom's imbedded reporters. Their high-bandwidth satellites, cellular communications, digital cameras and Internet combine to transport news from the front lines to the headlines almost instantaneously.

The imbedded reporter concept was a double-edged sword. On the one hand, the media served as a "chaperone" of sorts, reporting on the conduct of the armed forces at war. These reports on U.S. troops in the field were unanimously positive, earning them the confidence and admiration of the public, including Americans opposed to the war. The truth was their greatest asset. No one could claim that the military was distorting the truth, because the chaperones were right there to report it. Even better, reporters unwittingly corroborated CENTCOM briefings and discredited Iraqi Information Ministry propaganda, removing any doubt about Iraq's history of lies. On the other hand, the instantaneous news and images, via pixilated satellite video transmissions, challenged CENTCOM and Capitol Hill leaders to answer the mail on every combat detail, including the rare occasions when U.S. soldiers made lethal mistakes. This immediacy of information through the media reduced reaction time for military message management, crucial in the battle for hearts and minds.

Winning hearts and minds is not an easy task, particularly when combating propaganda. For years, Saddam Hussein spouted propaganda through the media to persuade the world that Iraq did not possess weapons of mass destruction. He televised pro-regime demonstrations in the streets of Baghdad to soften world opinion toward Iraq and exacerbated anti-Americanism in the Middle East, even enticing Western anti-war protesters to volunteer as human shields. In Desert Storm, winning the hearts and minds of Iraqis was not all that important. The objectives were simply to eject Iraqi forces from Kuwait and render the Iraqi military incapable of invading again. In contrast, winning the hearts and minds of the Iraqi people was vital to Operation Iraqi Freedom's success. Coalition forces needed to be seen as liberators of the good people of Iraq against Saddam's repressive regime. U.S. media sources obliged, but the Middle Eastern media favored Saddam Hussein in their reporting.

Abu Dabi TV, Middle East Broadcasting Centre, and Al Jazeera unanimously favored Saddam's regime over the U.S. and the West. There are three reasons for this. First, Arabs and Muslims see U.S. news sources as Jewish controlled agents of the U.S. government. Deep seeded hatred of Jews in the region is overpowering and makes Arab and Muslim networks incapable of perceiving U.S. news sources as anything but conspiratorial. Second, the free press in the Middle East enjoys very little constitutional protection under those governments' laws, such as America's "freedom of speech" and "freedom of the press." This gives the governments of many Middle-Eastern nations some control over the media. The degree of control, actual or perceived, varies from nation to nation, but censorship, for instance, is common and often undermines balanced reporting. Third, the Arab Street harbors strong Anti-Western and Anti-American sentiment. Western liberators will always be suspect. They are simply seen as an unwelcome alien force that seeks to colonize and dominate the region and its people. (Ware)

This perception stands as a major obstacle for American as it struggles to maintain a slim advantage on the information front.

If the U.S. is seeking to maintain their edge in warfare they will have to aggressively pursue dominance of the information domain. Use of information at all levels of war is key to that dominance, but classifying it as tactical, operational, or strategic can be tricky. Modern information technologies, networks, and on the spot media reporting have caused a growing interrelationship between the three levels of war. The compression of time and space that characterizes modern war can blur those relationships even more. IO further obscures the lines of demarcation because strategic effects can often be achieved using tactical means. In the future, actions can be classified as strategic, operational or tactical based on their intended effect or ultimate contribution, but many times the accuracy of these labels can only be determined in retrospect. (JP-3, II-2) Only through careful analysis of the past can American leaders begin to predict how information will be used tactically, operationally, or strategically in the future.

The future of Information Operations

"There will be no front line in future wars. The enemy can be all around you. And if you hope to win, you must be able to get all around your enemy" Bruce Berkowitz - The New Face of War

Dominance in the information realm will determine who wins future wars. This includes dominance on all fronts and at all levels of warfare. The lines separating the tactical, operational or strategic will likely become more obscure. As bandwidth disappears as a limiting factor, information available to the individual soldier at the lowest level will become more complete. This will empower them to act on a tactical level, but create strategic effects. Information systems will range from the most technically advanced to the simplest, and will be employed

together to defeat the adversary, which may consist only of a network of non-state actors waging Cyberwar.

Cyberwar is a prominent theory among future warfare prognosticators, and its effects range from the tactical to the strategic. Cyberwar is what we traditionally recognize as IO and shares the same basic definition. "At a minimum it represents an extension of the traditional importance of obtaining information in war—of having superior [C4ISR technologies and smart weapons] and of trying to locate, read, surprise, and deceive the enemy before he does the same to you." But it also has broad ramifications for military organization and doctrine. (Arquilla, 31)

Notable is the requirement for *decentralized* execution in a highly networked military. This idea runs contrary to the earlier view that better technology will lead to centralized execution. With unlimited bandwidth, warriors at the lowest level will gain access to vast amounts of synthesized information. Assuming they are given mission type orders and clear commander's intent, they will be in a unique position to take the best course of action in each situation. Commanders at the highest level will be unable to micro manage lower level decisions. Instead they will require "Topsight…a central understanding of the big picture which enhances the management of complexity," (Arquilla, 31)

These tactical, operational and strategic concepts are consistent with future force initiatives. The U.S. Army is developing the Objective Force, which consists of small, lethal units operating independently, but highly networked to provide a common operational picture and superior battlefield awareness. In the same way that precision airpower redefined "mass" from the air, the Objective Force may redefine mass on the ground. There will no longer be a need for huge fielded forces to defeat the enemy. Indeed, the dispersed nature of future enemies will call for dispersed forces to defeat them. Finally, future command and control will resemble

an internet-like system that securely and redundantly links the observing, deciding and acting elements of the decision cycle. This type of integration between air, sea and ground platforms will permit a common operating picture of the entire theater.

A super-network such as "Battlespace Wide Web" could synthesize all the available information of every participating system to allow platforms to "push" and "pull" data on demand. (Colella) Airpower platforms such as Multi-sensor Command and Control Constellation and Aircraft (MC2C and MC2A) and Roll-on-roll-off Beyond line of Sight Enhanced (ROBE) are key enablers of this vision. (Behler) The resulting detailed battlespace picture would improve combat survivability, efficiency, and situational awareness at the tactical level of war. Greater access for senior commanders to monitor the battle, either airborne or from a remote location, would enhance "Topsight" and consequently improve performance at the operational and strategic levels. The upshot is full spectrum information dominance.

Conclusion

Today the capacity to collect, analyze, disseminate and safeguard information is the most important characteristic defining military and national power. For the United States, nowhere was that capacity demonstrated more clearly than in the battles waged in Iraq over the last decade. From Desert Storm, the world's threshold event for modern information warfare, to Iraqi Freedom, the ultimate example of media warfare, Iraq represents the full spectrum of information operations.

Information Operations has been used throughout the entire history of warfare, but recent leaps in information technology have spurred renewed interest in this ubiquitous medium. Communications, stealth, GPS, computer networks and instantaneous media reporting represent a just a few of its elements. IO touches everyone and everything, from the rifleman in the desert,

to the diplomat at the UN. And it is the means by which present and future wars will be won and lost. Indeed it applies across the full spectrum of military operations and pervades all levels of war…tactical, operational and strategic, making it a nation's single most powerful weapon.

Bibliography

Arquilla, John and David Ronfeldt, editors, *In Athena's Camp: Preparing for Conflict in the Information Age,* (Washington D.C., RAND, 1997)

Behler, Maj Gen Robert F. "C2 and ISR Systems and Employment." Lecture. Air Command and Staff College, (Maxwell AFB, AL, 31 January 2003)

Berkowitz, Bruce, *The New Face of War: How War Will Be Fought In the 21st Century*, (New York, The Free Press, 2003)

Caterinicchia, Daniel, 16 Jan 2003, Federal Computer Week article, www.FCW.com

Colella, Robert A., "Building a Battlespace Wide Web," *Air and Space Power Chronicles – Contributors Corner*, Maxwell AFB, AL, Created 10 October 2001.

D'Amico, Robert, Dennis Lynn and Eric S. Wexler, "Munitions of the Mind: Strategic Information Operations," *Strategic Review*, Winter 2001, pp 49-57.

Elliott, Michael and Massimo Calabresi, "Inside The Secret Campaign To Topple Saddam," *Time Magazine*, 2 Dec 2002.

Glosson, Buster C., "Impact of Precision Weapons On Air Combat Operations," *Airpower Journal*, Maxwell AFB, AL, Summer 1993.

Joint Pub 3-13, Joint Doctrine for Information Operations, 9 October 1998.

Joint Pub 1-02, Joint Warfare for the Armed Forces of the United States, 14 November 2000.

McNamara, Louis E., "Riding the Information Revolution Tiger," *Aerospace Power Journal*, Maxwell AFB, AL, Fall 2001.

Toffler, Alvin and Heidi Toffler, "The New Intangibles," in In Athena's Camp, eds. John Arquilla et al. (Washington D.C., RAND, 1997)

Waller, J. Michael, "Losing a battle for hearts and minds," *Insight Magazine*, Washington, 22 April 2002.

Ware, Louis, Air Command and Staff College, Maxwell AFB, AL, interviewed by author, 28 March 2003.

Windle, David, "E-bomb may see first combat use in Iraq," 8 Aug 2002, www.newscientist.com